1. Which of the following is the correct Hardy-Weinberg Equation?
   a) \( p^2 + 2pq + q^2 \)  
   b) \( p^2 + pq + q^2 \)  
   c) \( p^2 q^2 + 2pq + q^2 \)  
   d) \( 2p^2 q^2 + pq + 2q^2 \)

2. Which of the following is the excretory organ of *Palaemon*?
   a) Lungs  
   b) Green gland  
   c) Malpighian tubules  
   d) External gills

3. Maximum percentage of CO\(_2\) produced in the tissue is transported to lungs in the form of
   a) Carba-amino compound of Hb  
   b) Dissolved condition in plasma  
   c) Bicarbonate ions  
   d) Carboxyhaemoglobin

4. Which of the following releases the hormone gastrin?
   a) G cell  
   b) Alpha cell  
   c) Delta cell  
   d) Beta cell

5. The symbol of Bombay Natural History Society (BNHS) is
   a) Blue jay  
   b) Hornbill  
   c) Blackbuck  
   d) Rhinoceros

6. A viriod is
   a) An acellular structure with DNA  
   b) A prokaryotic cell  
   c) An acellular structure with single naked RNA  
   d) An acellular structure with both DNA and RNA
7. Here are some observations: 1, 2, 2, 1, 4, 5, 6, 6, 3. What is the value of median?
   a) 5.3   b) 4
   c) 3   d) 3.3

8. Kappa particles in *Paramocium* is related to
   a) Osmoregulation   b) Cytoplasmic inheritance
   c) Mitochondrial function   d) Sexual reproduction

9. The fasting blood glucose level of a person is between 70-100 mg/100 ml of blood. The person is
   a) Normal/Non-diabetic   b) Abnormal/Diabetic
   c) Acute diabetic   d) No conclusion can be made

10. Which of the following green house gases has got the highest atmospheric life time?
    a) CO₂   b) CH₄
    c) N₂O   d) CFCs

11. Temperature-dependent sex determination is observed in
    a) *Drosophila*   b) Amphibians
    c) Reptiles   d) Sea Urchins

12. The most common plasmid vector used in genetic engineering is
    a) PBR328   b) PBR322
    c) PBR325   d) PBR330
13. If a person has antigen A and B in RBC, which antibodies will be present in the serum?
   a) Antibody a  b) Antibody b  
   c) Both the antibodies a & b  d) No antibody
14. Nutrition to immature spermatozoa is supplied by
   a) Seminiferous tubules  b) Ledyg cells  
   c) C - cells  d) Sertoli cells
15. In non primate mammals the cyclical changes during reproduction are called
   a) Oestrus cycle  
   b) Menstrual cycle  
   c) Menopause  d) Menarche
16. Parathromone deficiency in man causes
   a) Hypercalcemia  b) Hypocalcemia  
   c) Goitre  d) Hypernatremia
17. Vertebrate brain develops from
   a) Ectoderm  b) Mesoderm  
   c) Endoderm  d) Periderm
18. Barnacles growing on the back of a sea turtle is an example of
   a) Mutualism  b) Amensalism  
   c) Commensalism  d) Parasitism
19. Protozoans are classified basing on their
   a) Reproductive organs  b) Feeding organs
c) Adaptive organs  d) Locomotory organs

20. Sickle cell anaemia is due to a change in a single amino acid in the haemoglobin. The change is from
   a) Glutamine to valine  b) Glutamine to proline
c) Glutamine to leucine  d) Glutamine to serine

21. QRS in the working of heart is related to
   a) Auricular contraction  b) Auricular relaxation
c) Ventricular contraction  d) Ventricular relaxation

22. Formation of glucose from non-carbohydrate source is called
   a) Glycogenolysis  b) Gluconeogenesis
c) Glycolysis  d) Glycogenesis

23. What is the correct sequence of events in Prophase I of meiosis I?
   a) Leptotene-----Pachytene-----Diplotene-----Zygotene-----Diakinesis
   b) Leptotene-----Pachytene-----Zygotene-----Diplotene-----Diakinesis
c) Leptotene-----Zygotene-----Pachytene-----Diplotene-----Diakinesis
d) Leptotene-----Diplotene-----Pachytene-----Zygotene-----Diakinesis

24. Which organism shows both internal and external digestion?
   a) Amoeba  b) Sycon
c) Hydra  d) Plasmodium
25. The synthesis of protein from m-RNA is called
   a) Duplication  b) Transcription  
   c) Translation   d) Transduction

26. Molecules having same empirical formulae but different structural formulae are called
   a) Isomers  b) Anisomers  
   c) Isotopes   d) Isobar

27. The acrosome of mammalian sperm is derived from
   a) Mitochondria  b) Golgi complex  
   c) Ribosomes   d) Centrioles

28. Two bones in the skeletal system are joined by
   a) Ligaments  b) Tendons  
   c) Muscles     d) Neurons

29. Flemming in 1882 observed Lampbrush chromosomes in
   a) Eggs of protochordares  b) Salivary glands of dipteran insects  
   c) Oocytes of amphibians   d) Spermatids of Whales

30. The repolarisation of nerves during nerve conduction is caused by
   a) Influx of sodium ion  
   b) Efflux of sodium ion  
   c) Influx of potassium ion  
   d) Efflux of potassium ion
31. How many polar bodies are formed during formation of an mammalian egg?
   a) 1  
   b) 2  
   c) 3  
   d) 4
32. The number of chambers in the heart of cockroach is
   a) 12  
   b) 13  
   c) 14  
   d) 17
33. Viral infected cells produce
   a) Antibody  
   b) Interferons  
   c) Allergans  
   d) Toxins
34. Malaria in Odisha is
   a) Epidemic  
   b) Endemic  
   c) Epizootic  
   d) Contagious
35. Cells that actually release antibodies are
   a) T Lymphocytes  
   b) Cytotoxic T cells  
   c) Plasma cells  
   d) B Lymphocytes
36. Which is a beneficial lipid?
   a) VLDL  
   b) LDL  
   c) Triglycerides  
   d) HDL
37. Number of base pairs in human genome according to Human Genome Project is
   a) $3 \times 10^6$  
   b) $3 \times 10^7$  
   c) $3 \times 10^8$  
   d) $3 \times 10^9$
38. The part of brain affected when a person consumes alcohol leading to loss of balance is
   a) Cerebrum     b) Cerebellum
   c) Thalamus     d) Medulla oblongata

39. The villi of human placenta develops from
   a) Yolk sac     b) Chorion
   c) Allantois    d) Chorion and allantois

40. Which one of the following pairs is not correct?
   a) Down’s Syndrome–Chromosome 47
   b) Turner’s Syndrome–Chromosome 45
   c) Klinefleuter’s syndrome–Chromosome 45
   d) Patau’s Syndrome–Chromosome 45

41. Holandric genes are present on
   a) X chromosome     b) Y chromosome
   c) Autosomes        d) Both X and Y chromosomes

42. Clitellum of Hirudinea is constituted by segments
   a) 7th-9th         b) 8th-10th
   c) 9th-11th        d) 12th-14th

43. Correct sequence of epidermal layers in mammalian skin is
   a) Stratus corneum–Stratum lucidium–Stratum spinosum–Stratum granulosum–Stratum germinativum
   b) Stratus corneum - stratum granulosum - Stratum lucidium - Stratum spinosum - Stratum germinativum
c) Stratus corneum - Stratum lucidium - stratum granulosum - Stratum spinosum - Stratum germinativum

d) Stratus corneum - Stratum spinosum - Stratum lucidium - stratum granulosum - Stratum germinativum

44. The net number of ATP molecules produced in glycolytic pathway is
   a) 2  b) 4
   c) 8  d) 36

45. Who of the followings provided the first evidence that DNA is the genetic material?
   a) Frederick Griffith  b) Alfred D. Hershey and Martha Chase
   c) Chargoff  d) Mathew Meselson and Francois Jacob

46. Which hormone is involved in Cushing's syndrome?
   a) Thyroxine  b) Cortisone
   c) Aldosterone  d) Progesterone

47. Complete division of the egg into two cells is known as
   a) Superficial cleavage  b) Meroblastic cleavage
   c) Holoblastic cleavage  d) Epiblastic cleavage

48. Jacobson's organ is found in
   a) Bat  b) Sparrow
   c) Lizard  d) Rattle snake

49. Shell is absent in
   a) Octopus  b) Mussel
   c) Oyster  d) Sepia
50. Metamorphosis of frog tadpoles can be accelerated by the hormone secreted from
   a) Pituitary gland   b) Thyroid gland
   c) Adrenal gland   d) Thymus gland

51. Spemann's experiment on frog embryo describes
   a) Induction   b) Cell sorting
   c) Fate map   d) Movement of cells

52. Which one of the following statement is correct?
   a) Homologous structures are result of divergent evolution
   b) Homologous structures are result of convergent evolution
   c) Analogous structures are result of divergent evolution
   d) Analogous structures are not result of convergent evolution

53. Jelly fish belongs to the class
   a) Hydrozoa   b) Scyphozoa
   c) Anthozoa   d) Mastigophora

54. what is the colour of blood of Balanoglossus?
   a) Red   b) Blue
   c) Green   d) Colourless

55. Brain size of Homo erectus was around
   a) 900 CC   b) 1000 CC
   c) 1200 CC   d) 1400 CC
56. The common colon bacterium of human intestine is
a) *Entamoeba coli*  b) *Escherichia coli*

c) *Salmonella typhii*  d) *Lactobacillus salivarius*

57. Fishes successfully evolved during
a) Cambrian period  b) Permian period
c) Mississippian period  d) Devonian period

58. Vertebrates are
a) Chordates - Protochordates  b) Chordates + Protochordates
c) Craniates + Chordates  d) Protochordates + Cyclostomes

59. How many living orders are there in class Amphibia?
    a) One  b) Two
c) Three  d) Four

60. Two occipital condyles are observed in
a) Amphibia and Reptilia  b) Reptilia and Aves
c) Aves and Mammalia  d) Amphibia and Mammalia

61. Which of the following three are stop codons?
    a) UAA, UAG, UGA
    b) UAU, UGU, UGG
c) UAA, UAG, UAU
d) UAC, UAA, UGC

62. *Alytes* is commonly known as
    a) Horned toad  b) Midwife toad
c) Tree frog  d) ballooned frog
63. In an icosohedral virus, the number of vertices is
   a) 21                        b) 20
   c) 12                        d) 10

64. Bacterial transduction is
   a) Transfer of genetic material from one bacterium to another bacterium
   b) Transfer of genetic material from one virus to another bacterium
   c) Transfer of genetic material from one bacterium to another bacterium by a defective virus
   d) Transfer of genetic material from one bacterium to another bacterium by a defective prion

65. Agar is mostly obtained from
   a) Green algae                b) Brown algae
   c) Blue algae                d) Red algae

66. Commissure connects
   a) Two similar ganglia        b) Two dissimilar ganglia
   c) Muscle to nerve            d) Muscle to muscle

67. Pre and post-zygapophysis are parts of
   a) Vertebrae of frog          b) Pectoral girdle of monkey
   c) Skull of lizard           d) Sternum of bird

68. The aggregate of actively swimming aquatic organisms in an aquatic ecosystem is
   a) Plankton                   b) Nekton
   c) Neuston                   d) Benthos

69. Heterochromatin is
   a) Active and stain lightly   b) Active and stain deeply
   c) Inactive and stain deeply d) Inactive and stain lightly

70. Protection of a species in its natural habitat is known as
   a) *In situ* conservation     b) *Ex situ* conservation
   c) Germplasm conservation    d) Gene library
71. Two nucleotides in a DNA molecule are joined by
   a) Peptide linkage   b) Glycosidic linkage
   c) Disulphide linkage  d) Phosphodiester linkage

72. World Earth Day is celebrated on
   a) 22nd January  b) 22nd April
   c) 22nd July     d) 22nd October

73. Elephant was declared as the National Heritage Animal in the year
   a) 2006  b) 2008
   c) 2010  d) 2012

74. Who has given the biological species concept?
   a) Ernst Mayr  b) Charles darwin
   c) Ernst Haeckel  d) Lamark

75. Zika fever is spread through the bite of
   a) Anopheles mosquito  b) Culex mosquito
   c) Aedes mosquito  d) Mansonia mosquito

76. Which type of scale is seen in Scoliodon?
   a) Cycloid  b) Placoid
   c) Ctenoid  d) Ganoid

77. Which of the following taxonomic categories contains organisms least similar to one another?
   a) Species  b) Genus
   c) Family  d) Class

78. Identify the snake with neurotoxic poison.
   a) Naja  b) Bungarus
   c) Natrix  d) Daboia

79. When a frog is transferred from an environment with 20°C to another environment of 30°C, its body temperature will
   a) Remain unchanged  b) Rise half way to 25°C
   c) Rise to 30°C  d) Fail to adopt and die
80. Palamau Tiger Reserve is situated in
a) Jharkhand  b) Uttar Pradesh  c) Madhya Pradesh  d) Karnataka

81. During development of chick embryo, inward movement of cell is known as
a) Epiboly  b) Ingression  c) Invagination  d) Involution

82. The non-coding sequence of eukaryotic genes are called
a) Exons  b) Introns  c) Cistrons  d) Operons

83. Membrane-bound vesicles that contain enzymes for oxidizing small organic molecules with the formation of \( \text{H}_2\text{O}_2 \) are
a) Glyoxisomes  b) Lysosomes  c) Peroxisomes  d) Vacuoles

84. Under optimal conditions, one gram of haemoglobin can carry
a) 1.0 ml of oxygen  b) 1.14 ml of oxygen  c) 1.24 ml of oxygen  d) 1.34 ml of oxygen

85. Lac operon is
a) Structural and Repressor gene  b) Structural and Operator gene  c) Repressor and Operator gene  d) Repressor and Regulator gene

86. The ionizable groups of amino acid are at least
a) 4  b) 3  c) 2  d) 1

87. Which is the chief buffering system in blood?
 a) \( \text{K}_2\text{HPO}_4 \) and \( \text{KH}_2\text{PO}_4 \)  b) \( \text{NaHCO}_3 \) and \( \text{H}_2\text{CO}_3 \)
 c) B. protein & H. protein  d) B. Haemoglobin and H. Haemoglobin
88. Electrophoretic separation of molecules in a mixture is based on the
   a) Charge to mass ratio    b) Charge to density ratio
   c) Density to mass ratio   d) Molecular weight to mass ratio

89. Seasonal movements of animals from one defined place of residence to another are called
   a) Dispersals    b) Homings
   c) Migrations    d) Emigrations

90. Each pair of Mendel's factors (T and t) is located in
   a) A pair of non-homologous chromosomes
   b) A pair of homologous chromosomes
   c) The two sex chromosomes
   d) Two pairs of homologous chromosomes-one factor for each pair of homologous chromosomes

91. In induced breeding of fishes, the extract of which one of the following is used?
   a) Gonads    b) Pancreas
   c) Thyroid    d) Pituitary

92. The active site of an enzyme is formed by a few of the enzyme's
   a) R groups of the amino acids
   b) Amino groups of the amino acids
   c) Carboxyl group of the amino acid
   d) Exposed sulfur bonds

93. In feedback inhibition, a metabolic pathway is switched off by
   a) A rise in temperature    b) Lack of a substrate
   c) Competitive inhibition    d) Accumulation of the end product
94. According to Darwin, two different areas within a continent have different species because they have different
a) Ancestors  b) Evolutionary mechanisms
c) Environments  d) Evolutionary times

95. Which enzyme catalyses the synthesis of a new strand for a DNA molecule by linking nucleotides to the developing strand?
a) DNA ligase  b) DNA polymerase
c) Topoisomerase  d) Restriction endonuclease

96. The most effective means of conservation is to
a) Remove predators  b) Vaccinate against diseases
c) Preserve habitats  d) Census the species during breeding

97. Which of the following cellular organelles breaks down complex macromolecules, such as polysaccharides and proteins?
a) Golgi complex  b) Lysosome
c) Mitochondrion  d) Rough endoplasmic reticulum

98. If the sequence of bases along one side of a DNA molecule is AAGCT, then the complimentary sequence of bases on the other side of DNA molecule is
a) AAGCT  b) GGTAC
c) UUCGA  d) TTCGA

99. The most abundant lipid in a cell membrane is
a) Phospholipid  b) Steroid
c) Cholesterol  d) Cutin

100. Which of the following best describes the scientific method?
 a) Doing experiments in laboratories
 b) Collecting all known facts on a subject
c) Developing and testing hypotheses
d) Using sensitive electronic measuring instruments